4.3-3-5

TM-(L)-734/026/00

TECHNICAL MEMORANDUM

(TM Series)

This document was produced by SDC in performance of contract AF 19(628)-1648, Space Systems Division Program, for Space Systems Division, AFSC.

1604 Simulation Program Descriptions
Milestone 11

Simulation Data Generation Control Routine
(SDGC)

by

G. A. Madrid

15 March 1963

Approved

J. B. Munson

SYSTEM DEVELOPMENT CORPORATION
2500 COLORADO AVE.
SANTA MONICA
CALIFORNIA

TABLE OF CONTENTS

1.0 IDENTIFICATION

1.1 Title

Simulation Data Generation Control Routine (SDGC)

Ident: K04, Mod. 04

1.2 Programmed

12 December 1962, G. A. Madrid, System Development Corporation

1.3 Documented

12 March 1963, G. A. Madrid, System Development Corporation

2.0 PURPOSE

SDGC is used by SIPSA as a subroutine to initiate the ordered execution of the data generation subroutines pre-scheduled by SIPSA, to update the system time counters, and to pack and record the data outputs from the executed subroutines in the formats requested.

3.0 USAGE

3.1 Calling Sequence

```
L       SLJ     4       SDGC
L+1     NORMAL RETURN
```

3.2 Parameters

SDGC obtains its input parameters by extracting the contents from the following locations in SIPSA:

Location	Contents
(SIPSA +14) SIMPAR.....	A five-word table containing the SIPSA input parameters.
(SIPSA + 152)PASSTIME....	Length of generation in seconds.
(SIPSA + 165)SCHED.....	An 11-word table containing the addresses of the subroutines to be executed in the order of operation.
(SIPSA + 203)TLMODE.....	The telemetry mode specified for SIPSA.

3.3 Error Printouts and Operator Action

Two types of errors may occur in SDGC. Their printouts and meaning are as follows:

a. THE OUTPUT TAPE UNIT IS NOT READY. ENABLE UNIT LISTED BELOW THEN HIT START.

This error occurs if the output tape unit is not ready. The operator must enable the unit and hit start to continue.

b. TOO MANY WORDS ARE BEING GENERATED. TO IGNORE THE FCT CREATING THE OVERLOAD, SET KEY 2 THEN START.

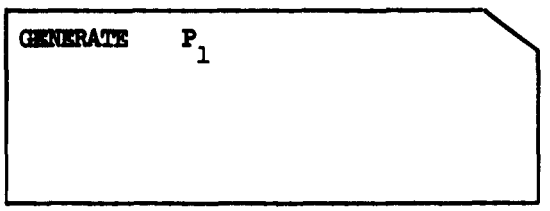
This error occurs if more than 75 words have been selected for generation in any one pseudo second. If it is desirable to continue without the excess data, set SLJ Key 2 and hit start to continue.

3.4 Tape Assignments and Usage

The tape assignments are dependent on the units specified on the SIPSA function card (TM-(L)-734/025/00). Unit number 3 is reserved for MTCII output and BCD output from the SIPSA System. Unit number 1 is reserved for the master tape containing the SIPSA System. At the CPDC and STA, tape units 2, 4-12 may be specified as parameters on the SIPSA function card.

3.5 Control Card Format

SDGC is referenced by SIPSA when it reads a Data Generation Control Card, after having read a START Card and one or more data request cards. The Data Generation Control Card (GENERATE) has the following format:

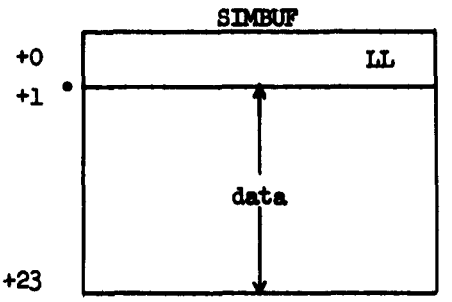


Columns	Content	Meaning
1-8	GENERATE	Name of the generation request function.
10-13	P_1	The number of seconds of data which will be generated for recording on the output tape. If this field is left blank and a Reset Tape is being referenced by SIPSA, data will be generated for the entire pass. Otherwise, this value or the duration will be used, whichever is least. If no Reset Tape is used, this field must not be blank or zero.

Since SIPSA reads this card, the P_1 field is processed in SIPSA. However, when SDGC is referenced, this value (PASSTIME) is extracted from the SIPSA Routine.

3.6 Input or Output Data

The input data to SDGC originates from the various data generation subroutines being executed. This data is transmitted to SDGC via a relocatable buffer area (SIMBUF, TM-(L)-734/030/00). The first word of this buffer contains the length of the message in the buffer. If the message is from a simulated telemetry computer, this length is complemented. The data in the buffer uses the message formats described in the Bird Buffer Combined Milestone 3 and 4, TM-(L)-834/000/01A.



The output data from SDGC consists of the same data contained in SIMBUF, except that in the case of a transfer tape selection (FS), only words, 1-8, are recorded on the output tape. For a BB Tape, the data from each subroutine on the schedule is accumulated as emanating from a telemetry or tracking computer at a tracking station. Each time the schedule is finished, this accumulated data is recorded in the format into which it has been packed. This packing area (DATA) is internal to SDGC. Its format is as follows:

STATION DATA RECORD (40, 48-Bit Words)

6-Bit Character	Content
1-2	0002
3-4	Number of simulated 160-A data words generated for the telemetry computer.

6-Bit Character	Content
5-6	Number of simulated 160-A data words generated for the tracking computer.
9-160	Area containing sequentially packed telemetry messages.
161-312	Area containing sequentially packed tracking messages.
313-320	System time in seconds.

3.7 Key Settings

Set SLJ Key 2 if it is desired to continue processing after an error stop caused by error b, Section 3.3.

4.0 METHOD

After the initialization request card and one or more data generation request cards are processed by SIPSA, a schedule is set up containing the addresses of the data generation modules that are to provide the simulated data requested. The GENERATE Card, which is read next, causes SIPSA to reference SDGC as a subroutine. SDGC then extracts the parameters necessary for its operation from their location in the SIPSA Control Routine and proceeds to execute, sequentially, the ordered addresses in the schedule. If a transfer tape is being prepared, the System Output Buffer (SIMBUF) containing the message prepared at that execution by the generation subroutine, is recorded on the output tape. This is done after the execution of each subroutine in the schedule until the generation time has expired. If a SIMSTN* Input Tape (BB) is being prepared, the data from each module is unpacked from

*SIMSTN is the Augmented Tracking Station Simulation Program. Refer to documents TM-(L)-734/015/00 and TM-(L)-734/033/00.

SIMBUF and packed sequentially into an area of another buffer (DATA) corresponding to the nature of the message (i.e., tracking or telemetry). This cumulative buffer is then recorded after the execution of all of the generation subroutines on the schedule. Generation continues until the designated duration has been reached.

SDGC will produce either a tracking or vehicle time record for an FS Tape or a data record (Type 2) for a BB Tape. Completion of the generate function returns control to SIPSA, which proceeds to read the next input sequence. If these inputs are more data requests, the generation cycle will be repeated. If they are termination requests, SIPSA will end all operations.

5.0 RESTRICTIONS

5.1 Minimum Hardware or Machine Components Required

Refer to Section 5.0 of TM-(L)-734/025/00, SIPSA Milestone 11.

5.2 Subroutines Required

SIPSA	SUBERR
SEAPA	FIX
SDOR	FLOATBIN
SCGR	STCA
STGR	STCB
SRGR	STCC
SIMBUF	STCD
TAPE	STCE

5.3 Limits on Input and Output Data

The input data in SIMBUF is limited to a maximum of 75, 160-A words (12-bit words), and the output data in DATA or SIMBUF is likewise limited to this amount.

5.4 Reference Pool Items Set or Used

ST.....Station Number

6.0 TIME REQUIREMENTS

The time required to operate SDGC is in direct relationship to the data being generated, length of pass, and the type of output tape being produced. An estimate of time of operation for the SIPSA System may be found in TM-(L)-734/025/00, SIPSA Milestone 11.

7.0 STORAGE REQUIREMENTS

	No. Registers In Octal	No. Registers In Decimal
Instructions	350	232
Storage	121	81
	471	313

8.0 VALIDATION TESTS

The inputs to the SIPSA System, as described in TM-(L)-734/025/00, SIPSA Milestone 11, were used as validation inputs for SDGC. The output from SDGC on magnetic tape showed that the data was processed in accordance with the design specifications. A complete description of the tests is found in the SIPSA Milestone 11 document.

9.0 REFERENCES

9.1 The Control Routine of the Simulated Input Preparation System for the Augmented SCF Environment at the STA and CPDC (SIPSA), Milestone 11, TM-(L)-734/025/00, System Development Corporation, 15 March 1963.

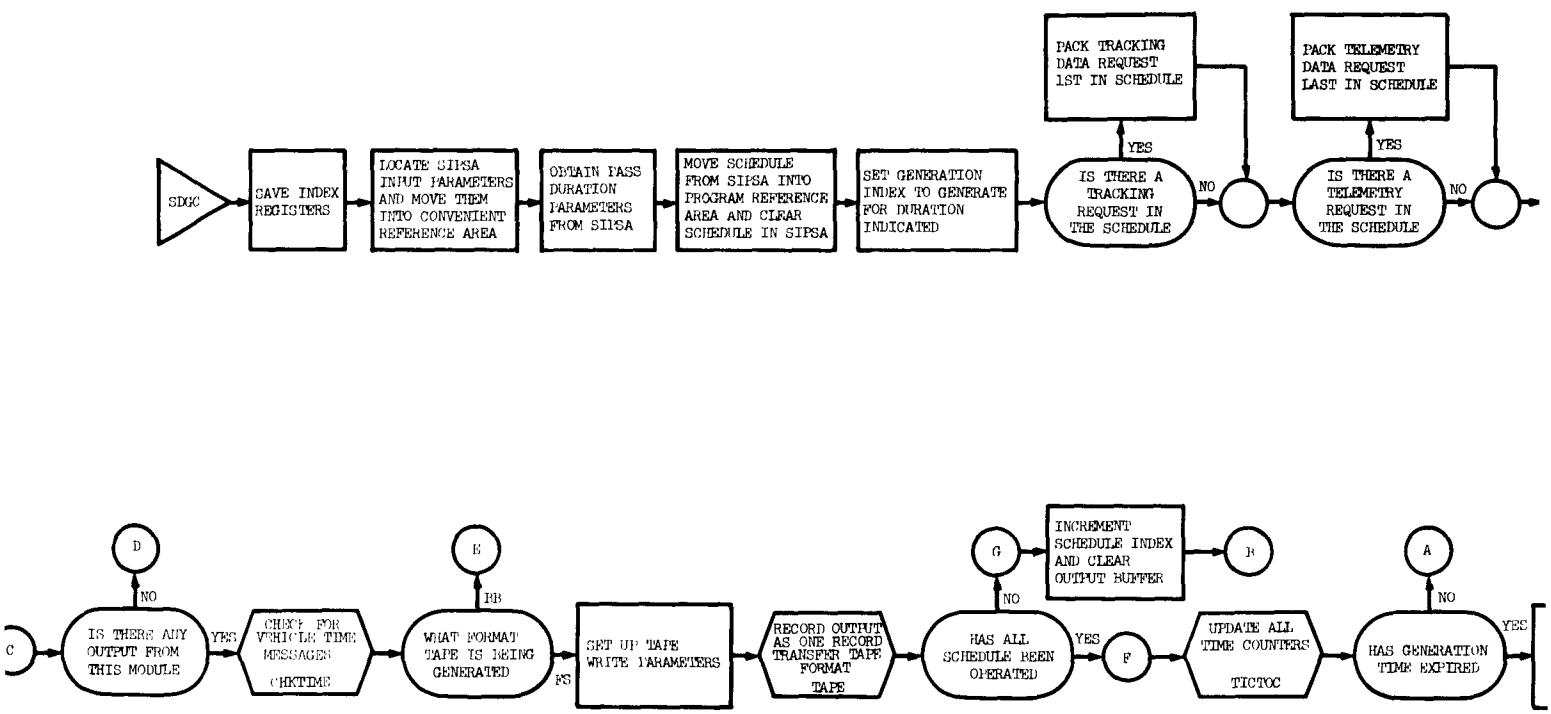
9.2 Bird Buffer Combined Milestone 3 and 4, TM-(L)-834/000/01A, System Development Corporation, 11 February 1963.

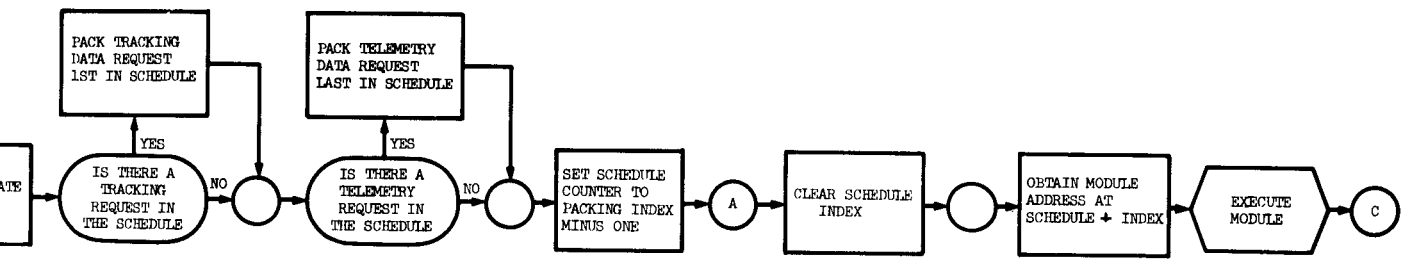
9.3 Operating Instructions for the Augmented Tracking Station Simulation Program, SIMSTN, Milestone 7, TM-(L)-734/033/00, System Development Corporation, 20 February 1963.

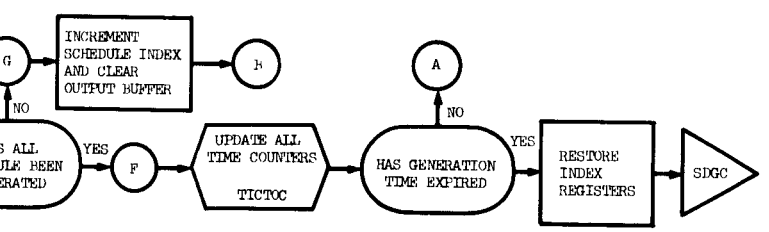
9.4 Computer Design Specifications for the Simulation of the Augmented SCF Environment at the STA and CPDC, Milestone 4, System Development Corporation, TM-(L)-734/015/01A, 9 January 1963.

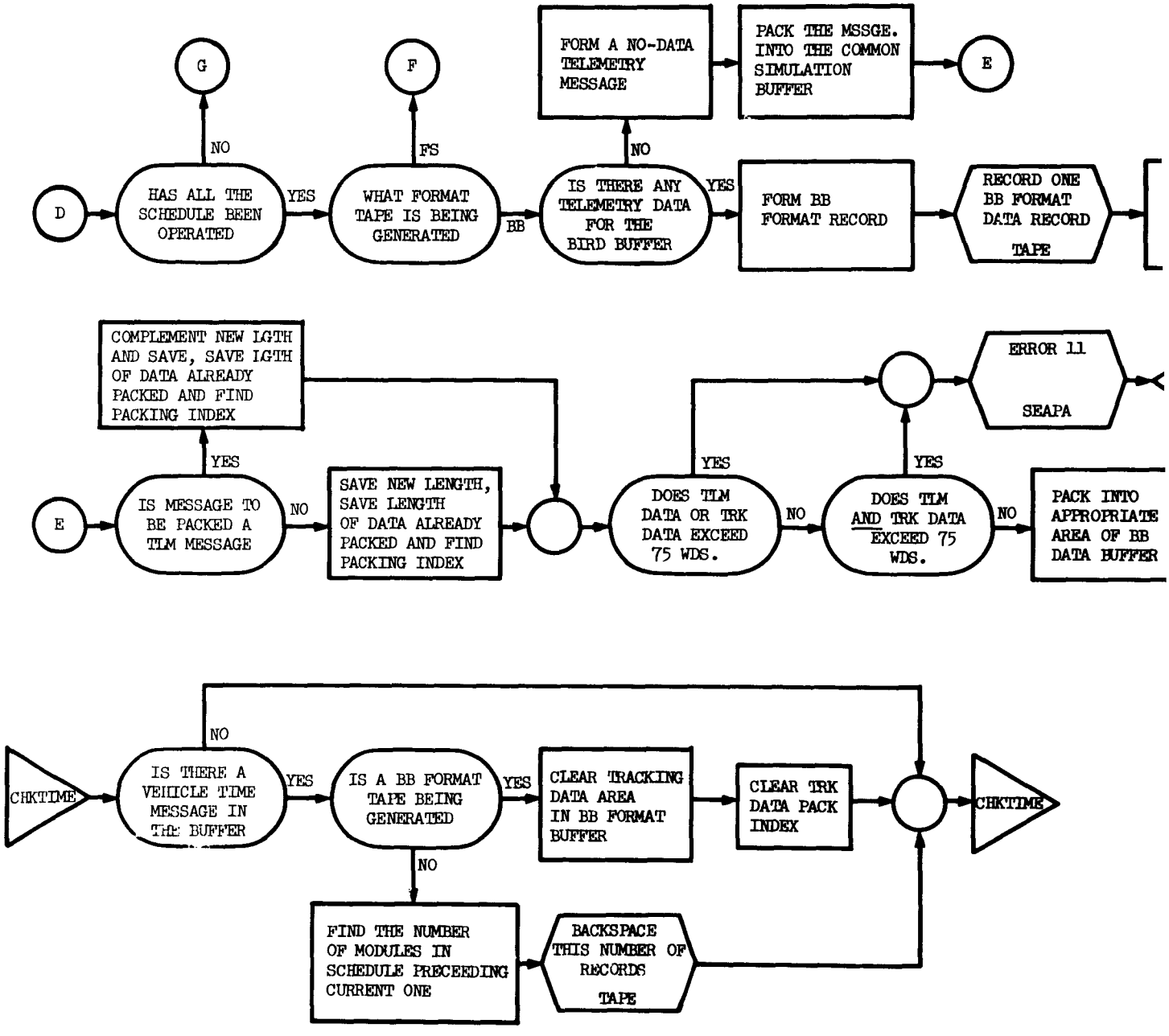
10.0 FLOW CHARTS

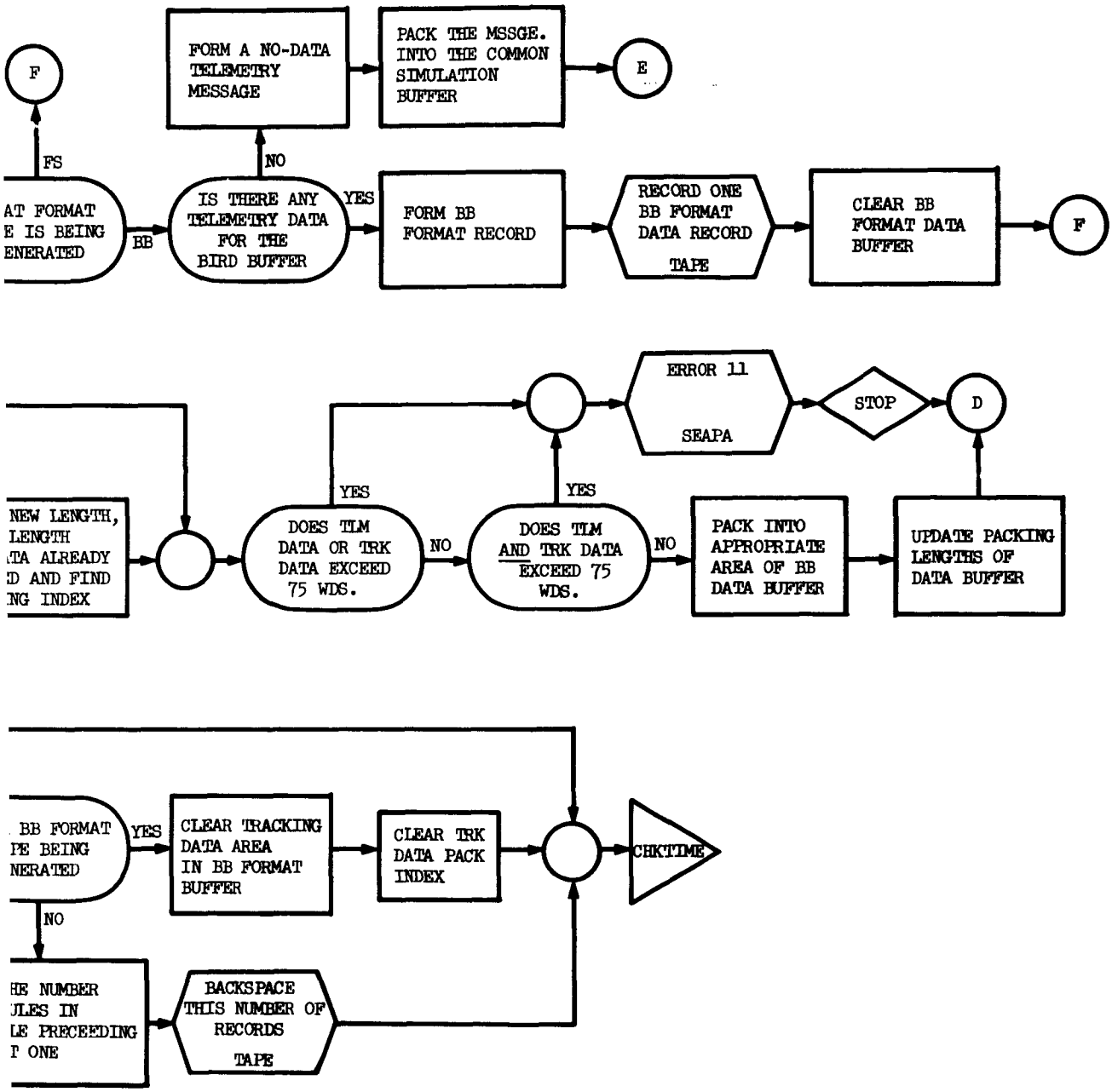
APPENDIX A


SDGC
SAVE INDEX REGISTERS
LOCATE SIPSA INPUT PARAMETERS AND MOVE THEM INTO CONVENIENT REFERENCE AREA
OBTAIN PASS DURATION PARAMETERS FROM SIPSA
MOVE SCHEDULE FROM SIPSA INTO PROGRAM REFERENCE AREA AND CLEAR SCHEDULE IN SIPSA
SET GENERATION INDEX TO GENERATE FOR DURATION INDICATED
IS THERE A TRACKING REQUEST IN THE SCHEDULE
YES
NO
PACK TRACKING DATA REQUEST 1ST IN SCHEDULE
IS THERE A TELEMETRY REQUEST IN THE SCHEDULE
YES
NO
PACK TELEMETRY DATA REQUEST LAST IN SCHEDULE
C
D
IS THERE ANY OUTPUT FROM THIS MODULE
NO
YES
CHECK FOR VEHICLE TIME MESSAGES
CHKTIME
E
BB
WHAT FORMAT TAPE IS BEING GENERATED
FS
GET UP TAPE WRITE PARAMETERS
RECORD OUTPUT AS ONE RECORD TRANSFER TAPE FORMAT TAPE
G
HAS ALL SCHEDULE BEEN OPERATED
NO
YES
INCREMENT SCHEDULE INDEX AND CLEAR OUTPUT BUFFER
B
F
UPDATE ALL TIME COUNTERS
TICTOC
A
HAS GENERATION TIME EXPIRED
NO
YES


PACK TRACKING DATA REQUEST 1ST IN SCHEDULE
PACK TELEMETRY DATA REQUEST LAST IN SCHEDULE
YES
YES
IS THERE A TRACKING REQUEST IN THE SCHEDULE
NO
IS THERE A TELEMETRY REQUEST IN THE SCHEDULE
NO
SET SCHEDULE COUNTER TO PACKING INDEX MINUS ONE
A
CLEAR SCHEDULE INDEX
OBTAIN MODULE ADDRESS AT SCHEDULE + INDEX
EXECUTE MODULE
C


INCREMENT SCHEDULE INDEX AND CLEAR OUTPUT BUFFER
B
NO
YES
F
UPDATE ALL TIME COUNTERS
TICTOC
A
NO
HAS GENERATION TIME EXPIRED
YES
RESTORE INDEX REGISTERS
SDGC


G
F
FORM A NO-DATA TELEMETRY MESSAGE
PACK THE MSSGE. INTO THE COMMON SIMULATION BUFFER
E
NO
FS
NO
D
HAS ALL THE SCHEDULE BEEN OPERATED
YES
WHAT FORMAT TAPE IS BEING GENERATED
BB
IS THERE ANY TELEMETRY DATA FOR THE BIRD BUFFER
YES
FORM BB FORMAT RECORD
RECORD ONE BB FORMAT DATA RECORD
TAPE
COMPLEMENT NEW LGTH AND SAVE, SAVE LGTH OF DATA ALREADY PACKED AND FIND PACKING INDEX
ERROR 11
SEAPA
YES
YES
YES
E
IS MESSAGE TO BE PACKED A TLM MESSAGE
NO
SAVE NEW LENGTH, SAVE LENGTH OF DATA ALREADY PACKED AND FIND PACKING INDEX
DOES TLM DATA OR TRK DATA EXCEED 75 WDS.
NO
DOES TLM AND TRK DATA EXCEED 75 WDS.
NO
PACK INTO APPROPRIATE AREA OF BB DATA BUFFER
NO
CHKTIME
IS THERE A VEHICLE TIME MESSAGE IN THE BUFFER
YES
IS A BB FORMAT TAPE BEING GENERATED
YES
CLEAR TRACKING DATA AREA IN BB FORMAT BUFFER
CLEAR TRK DATA PACK INDEX
CHKTIME
NO
FIND THE NUMBER OF MODULES IN SCHEDULE PRECEEDING CURRENT ONE
BACKSPACE THIS NUMBER OF RECORDS
TAPE


F
FS
AT FORMAT
E IS BEING
ENERATED
BB
IS THERE ANY
TELEMETRY DATA
FOR THE
BIRD BUFFER
NO
YES
FORM A NO-DATA
TELEMETRY
MESSAGE
PACK THE MSSGE.
INTO THE COMMON
SIMULATION
BUFFER
E
FORM BB
FORMAT RECORD
RECORD ONE
BB FORMAT
DATA RECORD
TAPE
CLEAR BB
FORMAT DATA
BUFFER
F
ERROR 11
SEAPA
STOP
D
NEW LENGTH,
LENGTH
TA ALREADY
D AND FIND
NG INDEX
YES
DOES TLM
DATA OR TRK
DATA EXCEED
75 WDS.
NO
YES
DOES TLM
AND TRK DATA
EXCEED 75
WDS.
NO
PACK INTO
APPROPRIATE
AREA OF BB
DATA BUFFER
UPDATE PACKING
LENGTHS OF
DATA BUFFER
BB FORMAT
PE BEING
NERATED
YES
CLEAR TRACKING
DATA AREA
IN BB FORMAT
BUFFER
CLEAR TRK
DATA PACK
INDEX
CHKTIME
NO
HE NUMBER
JLES IN
LE PRECEEDING
F ONE
BACKSPACE
THIS NUMBER OF
RECORDS
TAPE

15 March 1963 TM-(L)-734/026/00

DISTRIBUTION
(EXTERNAL)

Space Systems Division
(Contracting Agency)

Maj. C. R. Bond (SSOCD)
Maj. N. D. LaVally (SSOX)

6594th Aerospace Test Wing
(Contracting Agency)

Lt. Col. A. W. Dill (TWRD) (10)
Lt. Col. M. S. McDowell (TWRU)
TWACS (20)

PIR-E1 (Lockheed)

J.A. Boysen
N. N. Epstein
W. E. Moorman
G. F. Taylor
R. L. Vader
P. E. Williams

PIR-E2 (Philco)

J. A. Bean
J. A. Isaacs
R. Morrison
S. M. Stanley

PIR-E3 (LFE)

D. F. Criley
K. B. Williams

PIR-E4 (GE-Santa Clara)

D. Alexander

PIR-E4 (GE-Sunnyvale)

J. Farrentine
N. Kirby

PIR-E4 (GE-Box 8555)

J.S. Brainard
R. J. Katucki
J. D. Selby

PIR-E4 (GE-3198 Chestnut)

J.F. Butler
C. A. Cummings
H. D. Gilman

PIR-E4 (GE-Bethesda)

W. L. Massey

PIR-E4 (GE-Box 8661)

F. T. Clark
J. D. Rogers
W. R. Weinrich

PIR-E5 (Aerospace)

A. Bakst
J. W. Bengston
R. V. Bigelow
R. O. Brandsberg
L.H. Garcia
G. J. Hansen
M. L. Luther
T. R. Parkin
E. E. Retzlaff
R. G. Stephenson
D. D. Stevenson
V. White

PIR-E8 (Mellonics)

F. Druding (3)

NAME		ROOM
D. Reilly		24121
A. Robinson		24132
M. Rockwell		24086
J. Schroeder		24124
R. Scott		24110
C. Seacat		Sunnyvale
H. Seiden		22126
R. Shapiro		24110
S. Shoel		23007
R. Skelton		22152
N. Speer		24086
E. Stone		24058
M. Sweeney		25026
W. Taber		22101
T. Tennant		27029
J. Thompson		24088
C. Toche		24121
R. Totschek		24120
A. Tucker		22109
A. Vorhaus		24076
M. Weinstock		22131
S. Weems		22109
G. West		Sunnyvale
G. P. West		22116
H. Williams		22110
G. Wilson		24124
M. Winsor		22156
J. Winter		24117
R. Wise		22085
J. Wong		Sunnyvale
C. Zubris		24075
AFCPL	(5)	14059

15 March 1963 TM-(L)-734/026/00

DISTRIBUTION
(INTERNAL)

NAME	ROOM
D. Allfree	24083
J. Aldana	22131
L. Alexander	22134
N. Alperin	22153
E. Armstrong	24123
C. Becerra	24082
D. Biggar	24118
R. Bilek	23007
L. Brenton	24103
B. Burke	24086
R. Burke	22158
R. Busch	22088
C. Bustya	22134
M. Champaign	22152
C. Chiodini	24091
B. Ciaccia	24082
R. Clements	22109
B. Cline	24127
J. Cogley	22156
L. Conger	24088
P. Cooley	24086
D. Crum	24105
L. DeCuir	24053
W. Derango	24082
G. Dexter	25016
R. Disse	23014
G. Dobbs	22116
W. Dobrusky	24065
R. Dugas	22125
R. Ellis	22131
R. Ericksen	22113
H. Feldstein	24128
C. Francis	25013
H. Franks	24122
R. Frey	22078
L. Friedman	22122
S. Gardner	25026
V. Gergen	25014
I. Greenwald	22094
J. Haake	22153
D. Henley	22094
C. Hill	22101
J. Hillhouse	22078
H. Holzman	24065
G. Hudson	24126
R. Johnson	22125
P. Kastama	22076
M. Katz	25014
F. Kayser	24109
J. Keddy	24105
D. Key	23013
R. Keyes	24073
J. Kneemeyer	22088
R. Knight	22119
L. Kolbo	22155
J. Laughlin	24073
J. LaVine	24093
H. Lewis	23010
J. Little	24088
F. Long	22156
J. Lytton	24077
G. Madrid	22081
G. Mahon	24089
J. Marioni	24076
R. Marshall	22160
W. Martin	24127
J. McKeown	23013
J. Milanese	22155
J. Munson	22087
G. Myers	22095
P. Nelson	24075
J. Ng	22077
L. Ngou	24127
M. Olson	22161
L. Padgett	24110
E. Patin	Sunnyvale
D. Persico	24083
T. Polk	24113

UNCLASSIFIED

System Development Corporation,
Santa Monica, California
1604 SIMULATION PROGRAM DESCRIPTIONS
MILESTONE 11 SIMULATED DATA GENERATION
CONTROL ROUTINE (SDGC).
Scientific rept., TM(L)-734/026/00, by
G. A. Madrid. 15 March 1963, 10p.,
4 refs.
(Contract AF 19(628)-1648, Space System
Division Program, for Space Systems
Division, AFSC)
Unclassified report

DESCRIPTORS: Programming (Computers).
Satellite Networks. UNCLASSIFIED

Reports that SDGC (Simulation Data Generation Control Routine) is used by the ordered execution of the data generation subroutines pre-scheduled by SIPSA, to update the system time counters, and to pack outputs from the executed subroutines in the formats requested. UNCLASSIFIED

UNCLASSIFIED